



2 1 4 3 5

1. Robert L. Pearson, Refuge Manager - GS-11 - PFT
2. Thomas R. Tornow, Assistant Refuge Manager - GS-9 - PFT
3. Elizabeth A. Benway, Refuge Assistant - GS-5 - PFT
4. Vincent J. Marko, Maintenance Worker - WG-8 - PFT
5. J. Scott Foster, Maintenance Worker - WG-7 - PFT*

*Transferred from Crescent Lake NWR - 06/26/83

Review and Approvals

Robert L. Pearson 3-6-84
 Submitted by Date

 Regional Office Review Date



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1

2

TEMPORARY PERSONNEL

1. Michael W.D. Freeman - Maintenance Helper - WG-5 - Temporary*
2. Glenn A. Noble - YCC Youth Leader - 06/06/83 - 09/02/83
3. Bill C. Judge - YCC Enrollee - 06/06/83 - 09/02/83
4. Alan D. Scott - Bio Aid - GS-2 - 30 Day Special Need**

*05/09/83 to EOY (8 month appointment)

**10/27/83 to 11/25/83

INTRODUCTION

Location/Habitat Zone

Western edge of northern Great Plains some 50 miles east of the Rocky Mountains. Twelve miles north of Great Falls, Montana, on the Bootlegger Trail (State 225).

Natural Features

Six thousand acre glacial lake bed with a 240 square mile watershed drained by Lake Creek. Water levels in excess of 20 feet (3633 msl) would flow through Black Horse Lake, then on to the southeast some 15 miles to the Missouri River. Grasslands are native short prairie, primarily composed of western wheatgrass and green needlegrass.

Established 1929

President Herbert Hoover set aside 12,235 acres for "use as a refuge and breeding grounds for birds" by Executive Order.

The unit was unmanned until 1961. Natural runoff provided only occasional good years - its potential was proven but good water years were too infrequent. Waterfowl production, migrational use and hunting use were undependable.

Development

Local support and political pressure finally resulted in the Fish and Wildlife Service obtaining a major supplemental water source in 1957 - - return irrigation flows in Muddy Creek from the Greenfields Irrigation District - - and the subsequent development of a pumping station and associated delivery systems into Lake Creek to provide water annually to Benton Lake.

The old glacial lake bed was subdivided into six marsh units with dikes and control structures to allow somewhat independent diversion into these units.

The headquarters complex was completed in 1962 and personnel assigned for active management.

Management Practices

In the 1960's management was concerned with stabilizing and protecting the new dikes and water control structures. Grazing intensity was reduced to improve range conditions. Shelterbelt shrub and tree plantings were undertaken. Six hundred acres were broken out of the native grasslands and planted to small grains for supplemental food supplies for the increasing waterfowl numbers.

In the 1970's the 600 acres of croplands were gradually converted to a permanent cover (DNC) for the ducks. Cattle grazing was terminated to improve nesting cover conditions on the native grasslands. Research studies have proven that substantial wildlife benefits are gained by eliminating grazing from duck production areas. Studies at Benton Lake indicate an annual use of as many as nine duck nests per acre on the DNC units and about a tenth that rate on native grasslands. Botulism, a poisonous toxin producing bacteria, became a serious problem with up to 20,000 birds lost in one year. Water level manipulations and cleanup operations have kept losses to 2000 or less

in recent years.

In the 1980's new management thrusts are focusing on increasing emergent cover distribution through the use of a new inter-unit pumping system. The four lower units will be operated at shallower water depths and the accumulating excessive salt load (TDS) will be gradually flushed into Unit IV to try to freshen the water in the other units.

Increasing nesting islands and artificial nesting structures such as round straw bales are being used in combination with a temporary hunting season closure to stimulate local production of Canada geese. Botulism hazards are being further reduced by developing complete drainage capability on each unit by ditching. Water surface acres are being reduced somewhat to help offset the deficit in nesting cover and to help reduce energy costs.

The permanent nation-wide decline in available wildlife habitat necessitates intensive manipulations of both habitat and animal populations in a variety of ways to meet specific goals.

Wildlife Response

Of some 378 bird species known to visit Montana, 188 have been recorded at Benton Lake and new ones are observed each year and added to the bird list. Of the 60 species of birds known to nest at Benton Lake, 12 are ducks. Annual duck production has exceeded 30,000 but averages closer to 20,000. Canada goose production has reached 100 and is increasing. Other migratory birds that reproduce here by the thousands include the Franklin gull, eared grebe and the American coot. The upland game birds of gray partridge and ring-necked pheasant have responded well to the improvements in upland food and cover as have the mourning dove and many other small birds. Use by the burrowing owl, long-billed curlew and McCowan's longspur has declined.

The second goal at Benton Lake is to provide for the needs of birds during the spring and fall migrations as the birds move to summer production areas north of here and to wintering areas to the south and southwest. Peak concentrations in recent years have reached or exceeded the following levels: ducks - 100,000 (April and September); whistling swan - 4500 (April and November); Canada geese - 2000 (November). Use by the endangered bald eagle and peregrine falcon has also increased in recent years.

Due to the extreme winter climate and the lack of topographic diversity at Benton Lake, resident species diversity and numbers are somewhat limited. The marsh is too shallow to sustain a fish population.

We have records of twenty different species of mammals occurring here but only a very few reptiles and amphibians. In the winter the white-tailed jackrabbit and the long-tailed weasel are the mammals most frequently seen. In the summer the Richardson's ground squirrel ("gopher") and the muskrat are the most frequently seen. Both species of deer and an occasional pronghorn are seen in low numbers on the refuge.

Benton Lake is now one of the most productive waterfowl refuges in the United States.

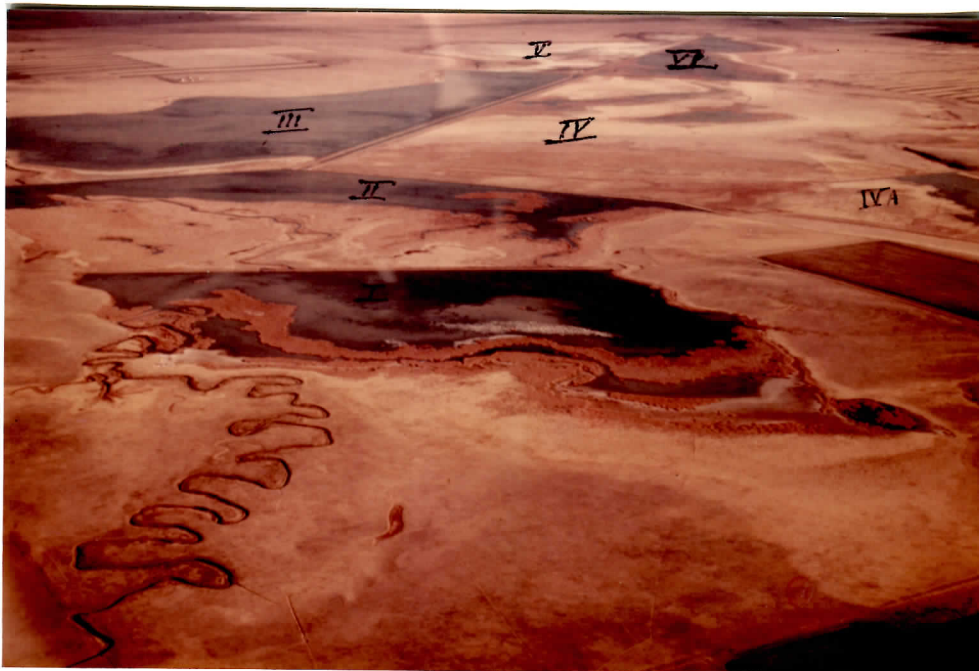
Public Use

Public use is limited to day use from March through November of each year. The local school system uses the refuge for well organized environmental education field trips in May studying plants, birds and insect life. A hunting program is conducted on part of the refuge in October and November for waterfowl and a limited harvest of upland game birds is allowed. Special regulations and information on the hunt are printed with a map and are available from the refuge.

Most of our visitors enjoy observing or photographing wildlife. There are no facilities on the refuge for picknicking or camping.

The refuge staff also administers the Small Wetlands Program in ten north central counties in Montana. In this program permanent marsh habitat has been acquired with duck stamp dollars. The purchased marsh units are identified with boundary signs as Waterfowl Production Areas. An important part of this program involves the converting of cropland acres into secure permanent nesting cover (DNC). We currently manage 18 units in this program with just over 8000 acres. These units are open to trapping and hunting in accordance with state regulations.

Permanent protective easements are also purchased on temporary and seasonal wetlands to protect them from drainage, filling and burning of the marsh vegetation.



Looking west to east - waterfowl have their choice of units of open water, water interspersed with emergents, or shallow flooded units. The snow geese preferred the area next to the cattail in the center of the picture.

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A. HIGHLIGHTS

1. A new spring migrational peak of 102,000 ducks - page 23
2. A late spring snow storm on May 9 and 10 dropped 20 inches of snow on early nesting pintail and mallard - page 25
3. Field studies reveal a new record duck nesting use rate of 9.77 nests per acre in DNC Unit 7 - Page 25
4. Nest cards were completed for 573 duck nests in cooperation with Northern Prairie Wildlife Research Center recruitment study - page 28
5. The refuge hosted a tour and steak fry for Montana and Wyoming refuge managers in August - page 35
6. The number one pumping unit at Muddy Creek was rebuilt in Idaho - page 42
7. Botulism losses remained at low levels this year on the refuge - page 33
8. Waterfowl production projected at 29,054 - page 23
9. Fall waterfowl populations reached a peak of 129,000 - pages 21 - 23
10. Canal and island construction was undertaken in the Unit V marsh - page 38
11. Elevated levels of lead poisoning were detected in waterfowl this fall - page 33
12. A record cold spell occurred in late December with readings of 50 below zero - or lower - page 3

B. CLIMATIC CONDITIONS

Nineteen eighty-three began drier and warmer than normal. Using December, 1982, January and February, 1983, we had the fifth warmest winter on record since 1893.

Temperatures rose to 60° in January and created temporary openings in some of the ice covered water units. Very little precipitation was received in either January or February. In February high temperatures were in the 60's. By the 18th many areas of open water were observed and the water units were 60% ice free by the end of the month.

March brought some much needed precipitation with nearly seven inches of snow on the 18th. This was followed by several days of very cold weather.

There were no April showers this year and precipitation was way below normal for the month. Temperatures rose to the 60's and low 70's by the end of April.

On May 9th and 10th a severe storm hit the area dumping over 20 inches of snow. The snow was accompanied by strong winds which blew down power lines and closed highways in and out of Great Falls. Electricity to the refuge was knocked out for 45 hours and in surrounding areas the outages lasted much longer. By the end of the month temperatures has risen to the 80's.



This shoveler hen, while doing the snowshoe one-step, would agree that finding a needle in a haystack would be more comfortable than trying to find her nest in this mess.

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Precipitation was about normal for June and high temperatures were in the 70's and 80's for the entire month.

July was the fourth wettest on record. Nearly four inches of precipitation were received. Temperatures hit 90+° early in the month, cooled considerably by mid month, and were again in the 90's by the end of the month.

August had unusually hot temperatures. A new record of 104° was set on the 6th. This was the third warmest August ever recorded. A severe hail storm during the month caused 100% loss to farm fields adjacent to the refuge but no damage occurred on the refuge.

A light frost on September 7th followed by killing frosts on the 19th and 20th ushered in the fall season. Snowfall for September tied the second highest record for the month at 7.7 inches. Temperatures averaged below normal, although a high of 95° was reached on the first.

No snowfall was recorded for October. Temperatures were unusually warm with a high of 75° on the 27th. November brought warm weather early in the month but dipped to -10° by the 30th. Over 14 inches of snow were received and most of it remained at month's end.

December hit a record low. The average temperature was a chilly 4° compared to the previous record of 11.2°. Many record daytime low temperatures were set including -42° on Christmas eve. The mercury hit the bottom of the thermometer at -50° at the refuge. Added to the cold, strong northerly winds dropped the chill factor to the -90° mark during the month. Needless to say, most outside work ground to a halt!

The weather information on the following table is provided by the National Weather Service at Great Falls International Airport, some 18 miles southwest of the refuge. There are considerable differences in both temperatures and precipitation. The refuge usually receives more snow than Great Falls but the annual precipitation is somewhat less.

TABLE I
WEATHER TABLE - 1983

	G R E A T F A L L S				R E F U G E
	Temperature (F)		Precipitation		Precipitation
	High	Low	Total	Depart	Total
January	60	- 2	.10	- .90	.08
February	63	3	.33	- .42	T
March	69	5	1.60	.67	.95
April	71	15	.26	-1.23	.14
May	84	23	1.34	-1.18	2.50
June	87	36	3.03	.28	2.03
July	96	43	3.78	2.68	3.61
August	104	45	1.10	- .21	1.02
September	95	26	1.89	.85	2.15
October	75	26	.77	- .05	.87
November	66	-10	1.28	.54	1.19
December	42	-42	.70	- .10	.69
1983	104	-42	16.18	.94	15.22

D. PLANNING

2. Management Plans

The major planning effort this year consisted of updating the station Safety Plan and Fire Management Plan. In January the refuge station Safety Plan was updated in accordance with 24 AM 1. The Fire Management Plan was updated and submitted for approval in May. However, continual additions to the format throughout the year has delayed the completion of the plan. At the close of the year, final editing was still in progress.

5. Research and Investigations

A University of Montana Zoology student, Deborah Dole, initiated a study on foraging ecology and territoriality of the American avocet. This study was under the supervision of Dr. Donald Jenni, Professor of Zoology, University of Montana. Coordination and keeping the field station apprised of what activities were planned and were being undertaken became a major problem with this study.

Miss Deborah Dole was signed up under a volunteer program and the refuge supported her study efforts by providing temporary lodging and by direct field support during the late summer leg banding of young avocets. Thirty-six of the young birds were captured and banded. One bird was found dead on the mud flats northeast of American Falls Reservoir, Brigham County, Idaho, on September 16, 1983.

We are interested in encouraging continued and further collegiate level field studies on the refuge but feel it imperative to maintain close coordination with such studies.



Graduate student Deb Dole used a combination of colored bands to mark individual avocet for collecting data on feeding and territorial behaviors.

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E. ADMINISTRATION

1. Personnel

Following months of frustrated attempts to add to our maintenance crew, we were able to secure an eight month appointment for a WG-5 maintenanceman. Mike Freeman entered on duty May 9th.

On June 27th Scott Foster, maintenanceman from Crescent Lake NWR in Nebraska, transferred to Benton Lake to fill a permanent maintenance position here. Scott and his family moved into the vacant refuge house and are a welcome addition to the refuge staff and social life.

We feel that with some seasonal help, refuge programs and work schedules can now be accomplished.

Alan Scott was given a 30 day special need appointment to assist Cal Henry, surveyor from the Bismarck Wetland Acquisition Office, in surveying Lake Creek and the proposed refuge drain. When the project was completed Alan collected specimens from ducks, geese and swans harvested on the refuge as part of a study to determine the amount of lead ingested at Benton Lake. See Section G-17.

On December 6th Maintenanceman Vince Marko completed 20 years of service at Benton Lake. He was presented with a certificate and tie tack by Manager Pearson.

Training during the year included:

Pearson:	Prairie Burning Workshop - Walden, Colorado, First Aid - USFS, Great Falls
Tornow:	Habitat Management Evaluation Workshop - Missoula, Montana, Prairie Burning Workshop - Walden, Colorado, First Aid - USFS, Great Falls
Benway:	Administrative Workshop - Great Falls, First Aid - USFS, Great Falls
Marko:	BLM Fire Suppression Training - Lewistown, Montana, Fire Workshop - Flint Hills NWR, First Aid - USFS, Great Falls
Freeman:	First Aid - USFS, Great Falls

In addition, Benway and Marko attended a seminar on wood burning stoves; Pearson and Tornow attended a project leaders' meeting in Denver; Pearson and Tornow participated in an interagency tour of Medicine Lake NWR and WMD; Pearson, Tornow and Foster attended law enforcement review and participated in handgun qualifications at CMR Refuge; Pearson and Benway attended a Women in Government seminar at Malmstrom Air Force Base; Pearson and Tornow attended AWP project leaders meeting in Great Falls.

Staffing patterns for the last five years are shown on the following page.

TABLE II

PERSONNEL

<u>Fiscal Year</u>	<u>Full Time</u>	<u>Temporary</u>	<u>YCC</u>
1983	5	2	2
1982	4	2	1
1981	4	4	
1980	4	2	
1979	4	3	

2. Youth Programs

Benton Lake had two YCC enrollees this year. Glenn Noble, 1982 enrollee, returned June 6th as YCC Youth Leader. Bill Judge, a recent Great Falls High School graduate, also reported on duty June 6th.

Glenn and Bill had a busy summer and contributed much to the general maintenance program. They spent considerable time in cleaning and maintaining the headquarters area, assisted with watering the newly transplanted trees, helped with the nest drags and nest checks, assisted with vehicle servicing, cleaned ditches along the Bootlegger Trail, assisted the fencing crew, helped with botulism cleanup and helped with projects at the Muddy Creek pumphouse.

Both boys were terminated September 2nd to return to school.

4. Volunteer Programs

Deborah A. Dole, a graduate student at the University of Montana in Missoula, requested permission to study the American avocet at Benton Lake Refuge. She and members of the Zoological Department at the University signed a volunteer agreement to cover her work here.

The refuge provided housing and some field support for the project. The study is to continue into 1984 and should terminate by late summer.

While at the refuge Debbie assisted refuge personnel in the early nest drags. The avocet study is covered in more detail in Section D-5.

5. Funding

Fiscal Year 1983 program costs were kept within the budgeted allotment. The largest single item in Benton Lake's budget, other than salaries, is the cost of pumping water from our pump station at Power to the refuge. Most of the pumping is accomplished in July, August and September. Therefore, it is necessary to program one-third of our yearly budget for the last quarter of the fiscal year. In some years, as was the case this year, precipitation amounts for the period are higher than anticipated, and less pumping is required. We are then faced with the task of putting those funds to the best use possible. This year spending was frozen before we were able to use the funds to the best advantage. We contributed several thousand dollars to the "kitty" to help those who were short.

TABLE III
FUNDING SUMMARY

FY	1210 ¹	1220	1240 ²	3100	Rehab	BLHP	Quarters Maintenance	TOTAL
83	185,000	12,000	10,000		60,000**		1,700	268,700
82	173,000	8,000	5,000				2,000	188,000
81	178,000		4,000	5,000*		89,000	4,000	280,000
80	130,000		4,000	5,000				139,000
79	132,000		6,000	5,000		121,000 ³		264,000

*Final year of 3110 funds

**Engineering job order carryover into FY 84

1 - Includes 1200 and 1220 funds prior to FY 82

2 - Includes 1500 funds

3 - Equipment project No. 10, habitat project No. 5 - WPA fencing

Major expenditures during the year included the revision of the refuge leaflet, the major overhaul of one of the Muddy Creek pumps, a riding mower, some new power tools for the proposed carpentry shop, the Foster family move to Benton Lake, and a new wood burning stove and kitchen range for residence 82. Quarters maintenance funds (\$1700) were used to re-roof the refuge buildings and to repaint the bedrooms and basement in residence 82.

6. Safety

Ten formal Safety meetings were held this year with an Administrative and Operational Inspection by Division I Chief Barney Schrank.



The refuge staff and families were trained in using the fire pumper. The refuge staff also received training in how to start up, move and shut off refuge equipment in case of emergencies.

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Safety activities during 1983:

- Refuge Safety Plan was updated in accordance with 24 AM 1.
- Ten Safety films were viewed.
- Barricades were installed around fuel pumps to safeguard collisions.
- The refuge staff and families were trained in using CO₂ and dry chemical fire extinguishers.
- SAFE Inc., under GSA contract, serviced the fire extinguishers.
- Refuge staff received 8 hours of First Aid training.

- The refuge staff and families reviewed all emergency gas and electrical shutoffs.
- Refuge staff received 4 hours of defensive drivers training.
- Flammable liquid and storage survey.
- Refuge staff and families trained in fire pumper use, start up and shut down of heavy equipment.
- Refuge Safety inspection survey.
- CO₂ fire extinguishers purchased for Muddy Creek pumphouse.
- Ear protection purchased and storage boxes installed on all heavy equipment.
- 2½ pound fire extinguishers were purchased and installed in all refuge vehicles and heavy equipment.

Only one injury requiring medical treatment occurred this year. Mike Freeman, maintenance helper, tore a rib cartilage while unloading ties from a flatbed truck.

7. Technical Assistance

Information and input was provided to the Western Area Power Administration's routing proposals for the 69 KVA power line from Great Falls to Conrad. The preferred corridor would be located five miles south of the refuge heading west then north, passing within one mile east of the Hartelius WPA and four miles west of the refuge, and then west toward the Fairfield Bench. The proposed location may have some impact on movements of waterfowl between the refuge and Freezeout Lake State Management Area.

The Upper Missouri Breaks Audubon Club was given assistance in the Christmas Bird Count in the Great Falls area. Manager Pearson again acted as compiler for this event which was conducted on December 17 under severe conditions (a high of -12°). Forty-one species were observed by the 14 hardy souls who persisted.

8. Other Items

Happenings of note during this year:

- 01/18-20 - Regional Project Leaders meeting - Denver, Colorado
- 08/13 - Division 1 picnic at the National Elk Refuge
- 08/30 - Division 1 Annual Work Plan meeting - Great Falls, Montana
- 08/31 - Division 1 Project Leaders tour of Benton Lake NWR
- 09/01-02 - Station Administrative Inspection - Barney Schrank, Bob Brown, Gerry Nugent (RO).

F. HABITAT MANAGEMENT

2. Wetlands

Winter weather for 1983 was quite mild and water units began opening up in late February. Spring runoff was minimal with a net loss of some 327 acre feet over winter. The primary runoff of 1100 acre feet occurred in mid May following a 20 inch snow storm which brought with it approximately 2.5 inches of precipitation. A total of 1763 acre feet was received from runoff throughout the season.

Fall weather was generally mild with freeze up dates on the units coming one to two weeks later than usual. The first skim ice on the units was observed on November 8th with all but roost holes frozen over by the 20th of November and the entire units tightly sealed with ice by the 25th of the month.

a. Pumping Operations

Pumping operations entailed the use of all three pumping systems this year with the main pumping system at Muddy Creek used to provide additional water supplies. The No. 1 and No. 2 pumps were used for a total of 2171 hours producing an estimated 2822 acre feet utilizing 679,680 kwh of electricity at a cost of \$14,620.10 or \$5.18 per acre foot of water delivered.

Water in Unit V was transferred by gravity into Unit VI this spring to re-flood that unit following construction work last year. After all gravity flow from Unit V occurred, Crisafulli pumping operations were undertaken to complete the dewatering to allow construction work in the fall. Pumping operations began June 27th and were terminated August 3rd. The operational efficiency of this pumping system was very poor with the GM diesel motor operating at idle on erratic time frames most of the summer. This power supply needs massive overhaul work and we plan to replace this 16 inch Crisafulli unit with a 12 inch electrically driven system for our portable pumping needs on the refuge.

The inter-unit pumping system was used to transfer the highly saline water out of Unit VI into Unit IV in late summer. Unit IV will be utilized as an evaporation pond to collect the accumulating salts from the other marsh units. Unit VI was then reflooded with fresh water from Muddy Creek. This is the first year this operation has been instituted in our water management programs at Benton Lake.

Operational summary on the inter-unit pumping system entailed pumping operations beginning August 31 and terminating on September 10, with an estimated 60 to 70 operational hours involved. Intermittent service was caused by electrical supply power problems and by operating the unit only during weekday periods. Estimated acre feet transferred from Unit VI was 220 acre feet utilizing 1320 kwh for a direct cost of \$168.20. This calculates out to approximately \$0.76 per acre foot transferred. These electrical charges do also include the operation of a 5 hp submersible pump used to supply water to the headquarters area for landscaping purposes.



Saline water is being pumped from Unit VI into Unit IV which will be used as an evaporation pond to store excess salts. This is our best alternative until a drain from Benton Lake is developed.

09/83

JSF

The refuge began the year of 1983 with 6450 acre feet in six impoundments. During the year 1763 acre feet were received in the form of runoff and 2822 acre feet were pumped in from Muddy Creek for a total of 4585 received during the year. Total water consumption on the refuge this year is calculated at 7428 acre feet with a net loss at the end of the year of 2843 acre feet leaving only 3607 acre feet remaining in the marsh for carryover into next year.

Field records for 1983 marsh units are recorded in Table IV.

b. Water Quality

Salinity of runoff waters was quite high with a range from 3680 to 5400 micromhos per centimeter while the pumped source water from Muddy Creek had a salinity reading of 600 to 850 during the pumping period. Runoff into the refuge from the Suek ranch just south of Unit VI measured 4600 micromhos per centimeter.

This year most of our source water from Muddy Creek was used primarily for maintaining water levels in Units I, II and III. The pattern of gradually improving salinity levels in these units can readily be seen from refuge records due to the diluting effect of source water from Muddy Creek. The flushing of highly saline water out of the low basin of Unit VI into Unit IV provides some interesting information. It is described further under individual unit descriptions.

TABLE IV

1983 ELEVATIONS - BENTON LAKE NATIONAL WILDLIFE REFUGE

Date	(Flowline)	UNIT I		UNIT II		UNIT III		UNIT IV		UNIT V		UNIT VI	
		Elev.	Sal.*	Elev.	Sal.*	Elev.	Sal.*	Elev.	Sal.*	Elev.	Sal.*	Elev.	Sal.*
		3621.0		3615.0		3613.0		3613.0		3613.0		3613.0	
01/01/83		3625.0		3621.0		3617.7		3615.6		3617.9		3614.3	
01/15/83		3625.0		3621.0		3617.5		3615.6		3617.9		3614.4	
02/01/83		3625.0		3621.1		3617.5		3615.6		3617.8		3614.5	
02/15/83		2625.1		2621.1		3617.5		3615.5		3617.7		3614.4	
03/01/83		3625.1		3621.1		3617.5		3615.5		3617.8		3614.2	
03/15/83		3625.1		3621.1		3617.5		3615.5		3616.9		3615.7	
04/01/83		3625.2	1900	3621.2	1200	3617.4	3600	3615.4	2600	3616.9	3900	3616.2	3900
04/15/83		3625.1		3621.1		3617.3		3615.3		3616.9		3616.1	
05/01/83		3625.0	2600	3621.0	1600	3617.3	4200	3615.2	3800	3616.4	4100	3616.0	4900
05/15/83		3625.8	2300	3621.2	1450	3617.3		3615.3		3616.6		3616.2	
06/01/83		3625.6		3621.1		3617.1		3615.0		3616.3		3616.2	
06/15/83		3625.4	2800	3620.9		3616.9		3614.7		3616.1		3616.1	
07/01/83		3625.5	2400	3620.9	2100	3616.9	4700	3615.0		3615.9		3615.8	5600
07/15/83		3625.7	1800	3621.2	1800	3617.6	1600**	3615.0	1600	3615.7	6200	3616.1	6500
08/01/83		3625.3		3620.9		3617.9		3614.8		3615.5		3615.9	
08/15/83		3625.1	2000	3620.4	1800	3617.7	2300	3614.8	2000	3615.2		3615.7	
09/01/83		3626.1	1400	3620.2	2000	3617.5	2600	3614.7		3615.3	2000	3615.4	9000
09/15/83		3625.3		3620.6	1800	3617.3		3615.0	5-10000	3615.3		3615.6	
10/01/83		3625.1		3620.3	1000	3617.3		3614.9		Mostly dry		3615.9	
10/15/83		3625.0		3620.7	800	3617.2	2100	3614.8	4900	Mostly dry		3615.9	2000
11/01/83		3625.0	1400	3620.6	1000	3617.1	2600	3614.7	3900	Mostly dry		3615.8	3000
11/15/83		3625.0		3620.6		3617.1		3614.7		Mostly dry		3615.8	
12/01/83		3625.0		3620.7		3617.2		3614.7		Mostly dry		3615.8	
12/15/83		3625.0		3620.7		3617.2		3614.7		Mostly dry		3615.8	
12/31/83		3625.0		3621.0		3617.2		3614.7		Mostly dry		3615.8	
Maximum Elev. (Design)		3627.0		3622.0		3618.0		3618.0		3618.0		3618.0	
Maximum Elev. - 1983		3626.1		3621.2		3618.0		3615.6		3617.9		3616.3	
General Pool Bottom		3623.0		3619.0		3615.0		3615.0		3615.0		3615.0	

*Salinity is measured in micromhos/centimeter

**Inflow (source water)

c. Unit Description

Primary water supply either from runoff or from the pumping station at Muddy Creek flows into and through Units I and II before reaching the central canal before independent distribution to the other four units can be made.

UNIT I

This unit began the year at water level elevation 3625.0. A peak water level was reached on the first of September at 3626.1 following pumping operations from Muddy Creek. The secondary peak occurred on May 15th following the snow storm on May 9th and 10th at a level of 3625.8. The unit ended the year at the same level as it began.

Submergent vegetation had excellent development in this marsh unit with a flower bed effect being observed from the expansive stands of buttercup. Other submergents in the unit included water milfoil and several species of pondweed. There was almost no observed algae bloom occurring in this unit this year. This is unusual and is thought to be due to reduced runoff and wind/wave action which contributes to higher water temperatures and turbidity of the water early in the season, thus reducing submergent growth in the early part of the summer.

In response to the excellent conditions for aquatics the swan population peaked at about 2500 birds using this unit on March 28th. Also this year a Franklin gull colony was established and nested successfully in the cattail stands. Heavy use by coot was observed in August and a buildup of some 15,000 mallards and 5,000 coot was observed in mid September. This unit always attracts larger numbers of mallards.

UNIT II

This unit started the year with water levels at 3621.0 and peaked only slightly higher through most of the summer at about 3621.2. Water levels were lowered due to the botulism outbreak in August. Water levels were then gradually raised to the 3620.7 level at the end of the year. Vegetative growth in the submergent aquatics in this unit was at record levels similar to that discussed in Unit I. A green scum of cattail pollen was observed on this unit and sometimes windrowed along the shoreline.

Waterfowl response to the excellent submergent stands was also noted on this unit. It was interesting to note the density of the aquatics was such that yellowlegs were commonly seen walking around on top of the vegetation out in the middle of the unit without any problems.

UNIT III

Water levels in this unit were at 3617.5 to start the year and gradually declined until pumping inflows were received in late June from Muddy Creek. Water levels were gradually elevated from the June 27th low of 3616.8 to the peak level of 3618.0 reached on July 28th. Water levels then gradually declined to the end of the year at a level of 3617.2.

Submergent aquatic development deteriorated in the early summer from a combination of shallow water conditions and heavy waterfowl use. A little deeper water levels and warmer summer temperatures provided excellent recovery and by fall a moderate stand of emergents was found throughout the lake basin. Filamentous green algae developed in the perimeter areas of this unit but was not an extensive problem as in past years. This unit provided the largest surface exposure to waterfowl and was the center of activity for fall migrants during the hunting season this fall. During the summer up to 200 young avocet could be counted around the perimeter shorelines of this unit. In the spring as many as 1000 swan were seen feeding on this unit by mid April.

UNIT IVa

This sub-unit held water in the spring and was again reflooded in the fall. During the summer period an extensive algae bloom of filamentous green algae developed in mid June and the unit was drained to counteract that condition. Wildlife use on this unit included increased goose nesting and a good increase in duck use in the early spring. In August an unusual observation at Benton Lake occurred with several hundred long-billed curlew using the unit as a migrational stop. After this unit was reflooded in mid September heavy use was immediate with up to 8000 mallards, 200 Canada geese and three great blue heron, which are infrequently seen at Benton Lake.

Wildlife use shortly after the opening of hunting season tapered off rapidly as this unit is relatively small in size and doesn't provide the birds an adequate safety margin.

UNIT IV

This unit is being used as a brine evaporation pond and only shallow water level management is exercised in this basin. This being the third year of consistantly shallow water levels in this unit, emergent vegetative response was significant with a very strong development of alkali bulrush in the shallowly flooded areas. Of interest also was the scattered establishment of individual cattail plants. Rain to some extent maintained the shallow water levels in mid summer and then the flushing action out of Unit VI replenished to some extent the water in the low basins.

Spring migrants responded spectacularly to this shallow habitat in Unit IV with thousands of pintail and mallard using these areas. A new spring peak population of pintail is thought to be the result of our shallow water conditions in this unit and also in the adjacent Unit VI.

Habitat conditions for Canada goose nesting use were somewhat less than desirable and only three of the fifteen islands were used for nesting by geese this year. California gulls moved in in force and set up colonial nesting on several of the islands in this unit.



The large spring population of migrating pintails found the burned portion of Unit IV attractive. The foxtail in the basin had been burned the fall of 1982, then reflooded.

03/83

RLP

A botulism outbreak occurred on one of the low basins of this unit in later summer. Water quality measurements were taken along the borrow areas of this unit prior to and just after the flushing out of the salty waters from Unit VI and pumped into this unit. Salinity levels at the five locations were as follows:

August 27	1800	2200	2600	5000	4500
September 21	3400	4500	4500	5200	4600

Some diluting effect on these readings near the pumpsite occurred from the canal which held water at 1800 micromhos per centimeter by leakage through the structure boards.

This fall muskrats moved into the spikerush areas of this unit and over 30 houses were counted. This is a significant increase in muskrat use, up from three or four along the borrow ditch in previous years.

UNIT V

Water levels in this unit began at 3617.85 and declined steadily through the summer. Dewatering efforts as previously mentioned were delayed considerably by the rains received during July. These rains combined with a faulty Crisafulli pumping operation delayed the drying up of the unit.

The last water in the three low areas out in the main basin finally were dry on the surface on September 1st. Drainage of the unit was hampered by accumulated silt in the borrow ditches and the fact of low topography out in the basin not permitting positive drainage to the borrow pit area for pumping.



Tom examines wet meadow vegetative growth on Unit V. By lowering water levels in July chenopodium is quite responsive. When the chenopodium is reflooded the seeds are a highly desired waterfowl food.

11/83

RLP

The vegetative development this year on this marsh unit was somewhat surprising in that most of the surface of the basin was found to have produced a solid 80% surface coverage primarily by sago pondweed, again substantiating the fact that sago pondweed dominates under shallower water conditions.

Wildlife use on this unit was heavily weighed toward the shorebirds but many ducks also took advantage of these easy pickings during the shallow water conditions and many broods were visible on the unit also.

UNIT VI

Water levels began at 3614.5 which is only a small amount of water in the borrow areas. This unit was dry for construction operations last year and was reflooded this spring in March using gravity flow from Unit V to refill the primary basin. The moderately shallow water level of 3616.3 was maintained throughout most of the summer by rainfall and

by Crisafulli pumping out of Unit V. In late summer water levels were allowed to decline by evaporation to the 3615.4 level. In September the inter-unit system was used to dewater the unit to the borrow pit stage. This water was transferred into Unit IV. Unit VI was then rapidly refilled from Muddy Creek source waters and the table below illustrates the change in salinity levels measured in this unit.

<u>Date</u>	<u>Pumpsite</u>	<u>Mid V/VI Dike</u>	<u>Far End</u>
08/27	8,000	9,000	9,500
09/09	10,000	Not taken	Not taken
09/21	2,000	2,000	2,800

Water quality readings were taken along the borrow ditch adjacent to the V/VI dike. On the last day of dewatering this unit the reading at the pumpsite had risen to 10,000 micromhos per centimeter. Following re-filling of the unit and allowing time for some equalizing of the water with the basin muds, readings were again taken. It will be interesting to see next spring whether these readings are still holding and how effective flushing actions out of the marsh units into IV can actually be in the long run.



Low water management is being used to convert large open water units into more desirable nesting and brood habitat. The emergent plants have responded significantly to the drying and shallow reflooding of the units. The browner growth is spikerush with alkali bulrush in the foreground.

07/83

RLP

Vegetative response this year to the shallow water regime was excellent stands of spikerush over 70 to 80% of the basin and an expansion of alkali bulrush moving out from the borrow ditch edges and into the basin. Alkali bulrush stands on the refuge this year are the most extensive that they have been since water management began in 1962. Shallow water management and spikerush and alkali bulrush are thought to be very positive in the security and survival of ducklings during the mid summer period. Again this year the green filamentous algae patch developed along the mid section of the V/VI dike but remained at about the same area coverage as was experienced last year.

Wildlife use on the unit this spring was quite extensive with up to 24,000 pintails and several thousand mallards using this unit at one time. Spring migrational use was only slightly less than that observed on the Unit IV basin. California gulls set up housekeeping on one of the eight newly constructed islands and a peregrine falcon was also observed to be resting on one of the new islands this spring. These islands appear to be quite popular for nesting by both the California gull and the avocet as well as the Canada geese but they don't appear to be very satisfactorily designed as far as loafing sites for ducks. These islands were not seeded and had little or no cover this year and this is thought to have contributed to their attractiveness for California gull use.

Following the dewatering of this unit and then reflooding this fall, teal use picked up in late September but as happened in Unit IVa, following the first hunting pressure on this unit, duck use was much less than expected. There appears to be a space and hunter accessibility relationship that reduces the security factor for the waterfowl using these units.

5. Grasslands

A land use conflict developed on or about October 29, 1983, when we became aware of an adjacent landowner's activity adjacent to the refuge which entailed a four-wheel drive tractor that apparently was used to create 18 inch deep ditches out of a saline seep area along our east/west boundary fence and then down slope through our fence into the refuge with the purpose of draining these excess waters from his croplands. The location of this incident is in the southwest corner of Section 7, T. 22 N., R. 3 E. at that point proceeding to the southeast into Section 17 on the refuge.

Upon investigation we determined that the activity was undertaken by a neighboring farmer and we began negotiations with him to take corrective action on the ruts and the unnatural runoff that his tractor had generated and for him to undertake repairs of the refuge boundary fence which we found had been cut in three different locations. This landowner had also excavated down to the underlying shale areas in an attempt to determine what the source of his excess water was and then he excavated with a backhoe several short ditches up to our refuge boundary or to the tractor generated ruts for purposes of drainage of his field of these excess waters.



This controversial "firebreak" was also draining a saline seep into the refuge. A heavy spring runoff will turn these tractor ruts into permanent soil erosion, that is if the strong winter winds don't fill the ruts in with topsoil from the fallow farming practices.

11/83

RLP

The landowner was not responsive to several attempts to communicate on the matter and appeared to be out of town on hunting trips and did not get back in touch with us until such time that we made it plain to his wife that the information we were requesting was for completion of field citations against her husband to get him into court if necessary to settle the matter. The landowner then became responsive and we did have an onsite meeting and obtained advisory assistance from the local SCS office to develop a land use plan which would meet both the landowner's needs and the needs of the Fish and Wildlife Service in this matter. These efforts will continue on the basis of maintaining positive relationships with our neighbors but unless the landowner carries out in good faith the necessary corrective actions, we will retain the right to due process through the court system for damages incurred.

A second fence cutting and attempt to drain into the refuge was located north along our boundary from that section corner into Section 8.

10. Pest Control

Annual control efforts using a mixture of Banvel and 2,4-D have been applied to the Lake Creek right-of-way and to the ditch areas near the Kloppel and Purdum Coulee control structures as in the past, primarily for the control of Canadian thistle. This year we observed very little of the white top noxious weed that we had problems with in the past two years. In lieu of allowing the Cascade County Pest Control office to control weeds along the

Bootlegger Trail where it passes through the refuge, we continue to undertake necessary minimum control measures on Canadian thistle within and along this right-of-way.

11. Water Rights

There appears to be only one significant change in the administration of water that would effect our water rights to the refuge this year. The administrator of the Greenfields Irrigation District has been replaced by the former assistant manager on that project. We were somewhat concerned early in the water season when we found inadequate supplies of water flowing down Muddy Creek past our pumpsite. We communicated with the Greenfields Irrigation District to try to determine why the drastic difference in water flows at that time and found that the new manager had undertaken a different procedure of water releases and distribution to conserve water throughout the Greenfields Irrigation District.

By the time we were ready to initiate pumping the following week, adequate flows were available. We invited the new administrator to a tour of our operation so he would better understand our dependency on these flows and what our wildlife concentrations were. He declined at the time due to heavy work load schedules - we will try again.

The Soil Conservation Service continues their project of improving irrigation methods and techniques on the northeast segment of the Greenfields Irrigation District which is that portion immediately effecting the water supplies into the upper end of Muddy Creek past our pumpsite. Other than the change in distribution effected by the new manager of the District, we have been unable to detect a significant change in return irrigation flows that would have an adverse affect to our operations from the SCS coordinated effort to improve irrigation efficiencies on that unit.

G. WILDLIFE

1. Wildlife Diversity

The refuge bird list contains 175 bird species. Since its revision in 1981 eight additional species have been seen on the refuge: gyrfalcon, Richardson's merlin, short-billed dowitcher, wood duck, osprey, orange-crowned warbler, catbird and northern oriole.

Uncommon sightings for 1983 were European wigeon, white-winged scoter and a snowy owl.

2. Endangered and/or Threatened Species

The bald eagle and peregrine falcon are the two endangered species that are fequently seen on the refuge during the spring and fall. Seventeen bald eagle sightings were recorded this year with a peak population of 3 on March

24th. Thirteen peregrine falcon sightings were recorded. Two peregrines were observed on the 5th of May and on the 20th of September.

Threatened species occurring on the refuge this year were the prairie falcon, ferruginous hawk, Richardson's merlin, white-faced ibis, western burrowing owl and an osprey.

We participate in the annual bald eagle mid-winter survey. Data is collected from a survey route on the refuge and sent to Regional Coordinator Chris Servheen. Raptor observation cards are submitted to the Montana Bald Eagle Working Group. Data is collected on all bald eagle and peregrine falcon sightings.

3. Waterfowl

Swan

Tundra swan were first seen on March 7th. By March 24th 1800 were present and on April 1st a record 4500 Tundra swans were present. By April 20th most of the swans had departed for their northern breeding grounds.



Early fall migrants find Benton Lake to be a good resting and feeding area.

10/83

JSF

Fall use began on October 2nd with a peak of 2500 on the 5th of November. Swan numbers slowly declined until freeze up which occurred on the 25th of November, two weeks later than normal. Record use days were compiled for both spring and fall use. Table V shows a comparison of peak populations and use days on an annual basis. The total use days objective was updated in 1981 to 300,000 use days. The previous objective was 33,700 use days.

TABLE V

BENTON LAKE WILDLIFE REFUGE

TOTAL SWAN USE DAYS - OBJECTIVE: 300,000

YEAR	PEAK POPULATION		SPRING USE DAYS	FALL USE DAYS	TOTAL USE DAYS
	SPRING	FALL			
1962	0	40	0	875	875
1963	150	0	1,442	0	1,442
1964	30	0	210	0	210
1965	90	60	1,155	1,470	2,625
1966	495	151	3,507	1,554	5,061
1967	62	120	497	1,113	1,610
1968	285	740	1,260	3,101	4,361
1969	50	90	805	1,386	2,191
1970	470	667	10,845	5,656	16,501
1971	550	200	6,804	2,338	9,142
1972	1,800	225	12,851	5,740	18,591
1973	600	1,000	16,650	6,900	23,550
1974	160	160	4,200	6,930	11,130
1975	160	110	1,200	6,400	7,600
1976	704	550	12,150	6,510	18,660
1977	1,580	1,150	28,212	33,020	61,232
1978	250	350	2,400	3,900	6,300
1979	130	750	920	24,000	24,920
1980	3,500	2,500	41,310	33,100	74,410
1981	4,100	2,000	45,500	15,200	60,700
1982	1,000	2,500	9,084	34,750	43,834
1983	4,500	2,500	120,612	52,359	172,971

Snow Geese

Snow geese were first seen on March 7th with little or no real peak observed. Eighty-nine were seen on the 9th of April. Average spring migrations generally peak at 1000. Fall use was a complete turn around with the first snows arriving the 12th of October. The peak population of 15,000 occurred on November 19th, and almost all had departed by the 22nd of November.

An increased migration of Ross' geese was seen moving through the refuge this year. The spring peak population on April 25th was 640 and the fall peak, November 19th, was 400.

Canada Geese

The extremely warm spring allowed small flocks of Canada geese to inspect the refuge in January and February. The peak population of 400 occurred March 19th. The first brood was seen on April 20th. A record 160 geese were raised to flight stage this year. See Table VI for previous production data.

Beginning in 1980 through cooperation with the Montana Department of Fish, Wildlife and Parks, the Canada goose hunting season was closed during the month of October on the refuge and adjacent land. This was done to protect our resident nesting flock. The refuge goose production objective was revised from 100 to 500 in 1981. It appears we are moving in the right direction and hopefully once the 500 objective is reached, the flock will be able to sustain itself under the full hunting pressure.

A flock of 100 cackling Canada geese was observed on the 19th of November. There were no observations of white-fronted geese on the refuge this year.

Total goose use days compiled were 327,050. The refuge objective is 400,000.

Ducks

The first spring migrants, mallard and common goldeneye, arrived February 18. By the second week in April 120,000 ducks had concentrated on the refuge. Pintails were the most numerous with 73,500 present. Very little runoff occurred in the spring and surrounding wetlands were dry. This seemed to concentrate the birds more on the refuge. The average spring peak population is 50,000 ducks.

The fall migration peaked at 95,000 during the last week in September. Surrounding wetlands were still dry causing an increase in numbers on the refuge. Total use days compiled this year were 10,475,000. The refuge objective is 8,000,000 use days.

The 1983 production was 28,894 with gadwall, shoveller and blue-wing/cinnamon teal the primary producers. The breeding pair count, conducted during the first week in June, was the second highest on record. Production was computed by reducing the breeding pair total of 8175 by 20% in the event that we had

TABLE VI

PRODUCTION BY YEAR

<u>YEAR</u>	<u>CANADA GOOSE</u> Objective: 500	<u>DUCK</u> Objective: 20,000	<u>COOT</u>
1962	0	412	10
1963	0	2,275	600
1964	0	1,315	750
1965	0	1,312	470
1966	0	4,352	1,470
1967	5	9,250	11,400
1968	11	28,158	29,750
1969	11	17,145	10,720
1970	9	39,253	8,485
1971	35	22,000	7,000
1972	40	13,600	1,000
1973	40	10,789	3,000
1974	29	9,890	200
1975	6	3,990	200
1976	43	21,750	3,000
1977	52	10,556	3,000
1978	25	7,930	2,000
1979	60	11,520	4,000
1980	48	31,350	4,000
1981	70	21,780	4,000
1982	100	18,092	5,000
1983	160	28,894	1,500

counted pairs still moving north to nest, as done in previous years production computations. The nest success rate (Mayfield Method) was determined by nesting surveys conducted this year. The success rate was multiplied by the average observed brood size to flight stage. Table VII and Figure I compare breeding pair counts and projected production for recent years (1972 and 1973 data didn't provide a species breakdown).



Lesser scaup broods provide a lot of public observation, as they generally stay in the borrow areas close to the dikes.

07/83

JSF

The "winter" storm in early May dumped 20 inches of snow on the peak of the mallard and pintail nesting activity. A lot of nests were destroyed and abandoned. Two nest searches were conducted the first week in May and the second week in June. A sample of 100 acres each of DNC and native prairie were searched. A breakdown of the species found and number of nests follows.

Search:	DNC - 7			Native Prairie	
	May	June		May	June
Pintail	177	126		2	1
Gadwall		270			2
Mallard	58	72			
Shoveller	24	67		21	10
Scaup		70			1
Wigeon		31			
BW/Cinn. Teal	1	23			5
Redhead		24			
GW Teal		1			
Unidentified		33			1
	260	717	(977)	23	20
Apparent Success	12%	80%		33%	77%

TABLE VII

HISTORY OF BREEDING PAIR COUNTS

SPECIES	1970	1971	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Mallard	745	406	75	26	208	181	113	130	580	623	357	932
Gadwall	992	809	980	332	979	968	222	665	2068	931	1148	1622
Wigeon	220	44	75	28	187	100	44	60	407	329	121	145
Pintail	857	241	270	287	612	287	249	335	842	606	451	1038
G-W Teal	80	13	33	20	53	103	36	34	205	69	43	32
B-W Teal	1468	752	322	278	580	885	178	180	572	836	582	1152
Cinn. Teal	726	186					119	60	303	236	261	249
Shoemaker	1327	508	360	260	488	533	245	310	1552	1918	1280	1648
Redhead	103	64	114	113	443	233	354	100	712	393	318	260
Canvasback	52	8	24	70	47	43	380	55	70	61	59	120
Scaup	431	556	275	295	362	231	537	225	1015	614	659	883
Ruddy	110	77	190	119	107	124	108	60	159	245	117	94
TOTALS	7120	3664	2718	1828	4066	3688	2585	2325	8485	6860	5608	8175
PRODUCTION	39,253	22,000	9890	3990	21,750	10,556	7930	11,520	31,350	21,780	18,092	28,894
Available Water - Sur. Acres - May	5442	4059	2228	4623	4545	2741	6001	5982	5000	3966	4077	4041

42
39
36
33
30
27
24
21
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18
15
12
9
6
3

FIGURE I
DUCK PRODUCTION BY YEAR
Objective - 20,000

62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83

Tom Klett from Northern Prairie Wildlife Research Center was consulted to run the data collected through the Mayfield Method. Tom supplied us with recruitment study nest cards. Data from 573 nests were obtained and as soon as computer time is available, a complete analysis will be made. From past studies, Tom informed us that the apparent nest success of 80% which we observed during the second search would probably compute somewhat lower (using the Mayfield Method) and the nest density computed would be somewhat higher than the actual nests found. It will be interesting to see the final computations.



When using the Mayfield Method to determine nest densities and success, the age of the nest is important information. By candling the eggs with an 8 inch length of radiator hose, the stage of incubation can be determined.

07/83

JSF

We were aware from previous years nesting studies that redhead parasitism of nests occurred. This year during the second nest search we found 87 nests parasitized by redheads. A total of 194 redhead eggs were found in these nests. We are uncertain of the exact success of these eggs, although we do know that a small percentage of these did hatch.

Every waterfowl refuge submits annual production figures and means of calculation. Some refuges use breeding pair routes, quarter section sampling, etc., and multiplying by Hammond's average brood size or field observations. Research has developed new techniques; Mayfield Method,

Mayfield-40% method, maximum likelihood method, etc. for estimating nest densities and success. When researchers are asked if reliable production estimates can be made from using nest densities and success rates, the answer is no. Calculations of brood survival rates are unknown. However, all will agree the new methods are better than the old count-em up and multiply-em out technique.

We requested Division 3 refuge biologist Lonnie Schroeder for his assistance. We needed a survey that would monitor the effects of our management practices and improve the reliability of data for our production report. The refuge nesting habitat types were delineated. In 1984 several sample plots of each habitat type will be searched for nests. Sample plots per habitat type were selected with regard to the slope of the land, variation in vegetative species, proximity to open water, cover to water interspersed in emergents and lake shoreline vegetation. We will then run the duck nesting data collected through the Mayfield Method and estimate production. The nest searches will be conducted annually to develop trends.

We will still conduct breeding pair counts so that a long term comparison can be made with previous years production data. However, we feel that it will be better data in the future for assistant managers to collect information from actual nests found, rather than looking at 19,000 ducks at Benton Lake and determining how many are breeding pairs, how many non-breeding drakes, and how many are going to move farther north after the June breeding pair count. With the new survey it will be easier to monitor the response of waterfowl to the management of the habitat.

Coots

Coots were first observed April 1. As many as 20,000 moved through during migration, but few stayed to nest. The shallow water conditions and lack of emergents didn't attract them. However, the shallow water management is developing extensive stands of alkali bulrush and undoubtedly the coot will respond to the nesting habitat. Production was estimated at 1500 this year. Table VI compares previous years production.

4. Marsh and Water Birds

The colonial bird register survey was conducted again this year. Small colonies of eared grebe and black-crowned night heron were observed. Eared grebe populations in May were 4000 but no distinct large colonies were formed, however, a lot of nesting occurred. Colonies of 15 and 23 black-crowned night heron nests were located in Unit I and II.

Other nesters on the refuge are the sora and pied-billed grebe. Occasional use by western grebe, horned grebe, double-crested cormorant, white pelican, American bittern, great blue heron and white-faced ibis occurs.

We had a dramatic increase in sandhill crane use this fall. Approximately 600 cranes were observed over a two week period in flocks of 10 to 90 in

the shallow water areas in the lake and in adjacent grain fields. Only 37 sandhill cranes had been recorded since 1977.



These sandhill cranes landed within 40 yards of living quarters 82, providing entertainment for us resident species.

09/83

JSF

5. Shorebirds, Gulls, Terns and Allied Species

The California gull colony expanded from the Unit III dike onto islands in Unit IV and VI. A June count found 400 active nests.

The Franklin gull colonies in Units I and II were smaller this year than previous years. An estimated 11,000 nests were projected from sample plots of 1000 square feet. Previous years projections were estimated at 20,000 nests.

Common and black terns are generally quite common nesters on the refuge, but didn't appear to nest this year and very few common terns were observed. Approximately 100 black terns were observed in the fall migration.

Shorebirds which nested successfully this year were the avocet, Wilson's phalarope, marbled godwit, upland sandpiper, willet, long-billed curlew and killdeer.

Shorebird use centered on the drying Unit V. An estimated 30,000 shorebirds were enjoying the shallow sheet water.



The shorebirds found the mudflats in Unit V as an excellent loafing and feeding area. Benton Lake is noted as being one of the highest producing avocet areas in Montana.

08/83

RLP

A fall migration of 200 long-billed curlew was seen in the foxtail of Unit IV.

6. Raptors



This young marsh hawk is getting ready to fledge from its nest which was found in DNC Unit 7.

07/83

JSF

Marsh hawks and short-eared owls were the only known nesters on the refuge. Non-nesters that are most commonly seen on the refuge are the Swainson's hawk, rough-legged hawk, golden eagle and great horned owl. Other raptors are mentioned in the Endangered/Threatened Species section.

Individual sightings of a snowy owl, burrowing owl, goshawk and gyrfalcon were recorded.

8. Game Mammals

Both white-tail deer and mule deer use is increasing on the refuge. Fawn of both species were frequently seen. One mule deer fawn was killed by a vehicle along the Bootlegger Trail this summer. The 1983-84 winter is the first winter on record that deer have stayed on the refuge. Twenty mule deer and an occasional white-tail deer have been seen throughout the winter months.

The local antelope population is quite low. This year individual sightings of 8 and 2 were made on the refuge.

10. Other Resident Wildlife

Pheasants experienced another good hatch this year in spite of the early May snowstorm. A pheasant crow count survey route was developed to get a base to develop population trends. Sixteen stops spaced one mile apart throughout the refuge were designed to monitor the number of crows during a two minute period. Five counts were made; the average number of crows per station was 3.9. The counts were made once a week during April and May.

The gray (Huns) partridge population is still quite low. The late May snowstorms that we have experienced in 1982 and 1983 have really effected the nesting success of the partridge.

Sharptail grouse are occasionally seen on the refuge.

Upland game hunting has been allowed in the past for gray partridge during the waterfowl season. This year we were closed to partridge hunting, but we opened the refuge to pheasant hunting.

We participated in the national mourning dove call count. Data is collected from a 20 mile survey route in Chouteau County and sent to the Office of Migratory Bird Management in Laurel, Maryland.

15. Animal Control

We have an approved control program for California gulls and white-tailed jackrabbits. This year the gull colony expanded onto the islands in Unit IV and VI. Measures were taken to keep them from taking over all the islands.

The rabbit control is to protect headquarters shelterbelts and landscaping. Rabbit populations are on the rise. "Flocks" up to 50 have been seen around headquarters, but minimal damage has occurred to the trees and no control measures were necessary.

17. Disease Prevention and Control

A tight grip on weekly cleanup operations during July - September helps keep botulism mortality down. We picked up 274 ducks and 40 marsh and water birds this year. The greatest loss occurred in Unit IV where 170 birds were picked up. Table VIII compares previous years botulism losses.

TABLE VIII

BOTULISM LOSSES AT BENTON LAKE

	UNIT I	UNIT II	UNIT III	UNIT IV	UNIT V	UNIT VI	TOTAL
1970	603	1365	5197	9098	3405	1841	21,419
1971		927	6295	2212	2627		12,061
1972	34	45	402		2964	6760	10,205
1973			1665		95		1,760
1974			986				986
1978*	65	2	24	719			810
1979	11	25	13	1017	19	63	1,148
1980		12	32	71	419	1272	1,806
1981*		10	15		15	10	50
1982	57	690	43		10		800
1983	11	62	61	170		10	314
TOTAL	781	3138	14643	13287	9554	9556	51,359

*No botulism losses were recorded in either 1975 or 1976. A scattering of badly decomposed duck carcasses were noticed in the fall of 1977 - cause of death was suspected to be botulism. In 1981 the weekly cleanup operations picked up 50 birds - cause of death uncertain.

This fall Benton Lake was contacted by the National Wildlife Health Laboratory to conduct a lead poisoning monitoring program. Bob Lange from the Madison Lab visited the refuge and briefed us on the collecting of samples from hunter killed waterfowl. From each bird killed the liver, gizzard and heart were collected. A total of 181 geese, swan, dabblers and divers were sampled.

The final analysis and report will not be available for several months. The preliminary data so far indicates that waterfowl at Benton Lake have a high incidence of lead. Sampling will continue through 1984 to gain more information.

In 1981 the Montana Department of Fish, Wildlife and Parks issued public warnings that the Montana Department of Health had found toxic quantities of Endrin in waterfowl and upland game birds. This year the warning was printed on the upland game proclamation and newspaper releases issued the warning prior to the waterfowl season. Waterfowl hunters were instructed to trim off all fat and skin from carcasses and fry thoroughly before consuming. Pregnant women and nursing mothers should not eat waterfowl.

Farmers in central Montana spray their fields in spring with Endrin to control cutworms. Endrin can still be utilized in Montana with approval from the State Agriculture Department.

H. PUBLIC USE

1. General

The refuge is open to visitor use except during the winter months. Due to the mild winter and early appearance of waterfowl, the refuge was open to the public March 1st this year. A nine mile tour loop allows visitors to view three of our water units surrounded by native prairie and contrasting DNC fields. We have no interpretive facilities. A refuge bird list is available and a revised leaflet was obtained this fall.



The quality of refuge photo files can be updated by asking photographers to volunteer copies of their slides. A lot of film, patience and time can be spent getting closeup photos of wildlife.

05/83

JL

2. Outdoor Classrooms - Students

The Great Falls School District conducts field trips to the refuge for the third and seventh grades. School district environmental education instructors have developed a program covering invertebrate life, ornithology and botany. This year 1423 students and teachers visited the refuge.

7. Other Interpretive Programs

Conducted tours and discussion of Benton Lake operations were given to 137 individuals representing a variety of organizations:

Don Childress, Montana State Pacific Flyway Representative
Bureau of Land Management Area Office
Division 1 Refuge Managers
Upper Missouri Breaks Audubon Club
Lonnie Schroeder, Division 3 Refuge Biologist
Gordon Sands and his attorney, Van Barron
Malmstrom Child Care Center
Cub Scouts



Division 1 refuge managers were given a guided tour of the refuge and discussion of the water management practices.

08/83

JSF

Benton Lake personnel made presentations and contacts with:

Local Congressional offices of Senators Max Baucus and John Melcher,
and Representative Ron Marlenee
Broadview Funds Mitigation Committee
Green-wing Chapter of Ducks Unlimited
Western Area Power Administration
Triangle Conservation District
Upper Missouri Breaks Audubon Club
Marias River Weed Action Committee

This proud hunter harvested the first "Tundra" swan of the season. An estimated 66 swan were harvested at Benton Lake out of a possible 500 permits for Teton and Cascade Counties.
10/83

JSF



Hunters with boats, decoys and dogs had the best success. Hunters were very cooperative in letting us collect internal organs for lead poisoning analysis by the Madison Lab.
10/83

RLP

8. Hunting

This year waterfowl hunters and use increased to the fourth highest on *Since 1973* record. Previous years hunting pressure had decreased nearly 40% due to the warnings of Endrin in waterfowl. This year's increase may be somewhat due to the fact that nearby Montana State WMA (Freezeout Lake) had low fall migrational populations of waterfowl. Approximately 2,789 hunters spent 8,367 activity hours to harvest 4097 ducks, 32 Canada geese, 52 snow geese, 8 Ross' geese and 66 Tundra swan.

This was the third year the refuge has been open to Tundra swan hunting. The Montana Fish, Wildlife and Parks Department issues 500 permits for swan hunting - Teton and Cascade Counties. In 1981 4 swan were harvested; in 1982 6 swan were harvested. This year's 66 swan is primarily due to the low numbers of swan present at Freezeout Lake WMA. Freezeout Lake has been the traditional place to hunt swan in Montana.

This year's snow goose harvest was the highest on record. The large numbers of snow geese on the refuge drew a lot of hunter interest, however, their ability to outwit the hunter discouraged many.

The refuge was open for the first time to pheasant hunting this year. Approximately 300 pheasant hunters bagged 120 pheasants. Success was limited to hunters with dogs working the heavy cover.

10. Trapping



Larry DiLulo, a professional trapper from Bridger, Montana, very effectively removed troublesome muskrat from the dike system.

02/83

TRT

Larry DiLulo from Bridger, Montana, submitted the highest bid of \$501.00 on a closed bid process to trap the refuge for muskrats this year. Larry was a real quality trapper and effectively removed troublesome muskrats from the dikes of the lower four units. In seventeen days including the days of arrival and departure, he trapped 305 muskrat, 11 striped skunk and 1 raccoon. To encourage Larry to trap skunk we allowed him to use refuge electricity to plug in his camper.

An additional 20 skunks and 2 raccoon were taken opportunistically by refuge employees during the nesting season.

11. Wildlife Observation

Approximately 9700 people drove through our tour loop this year, primarily to view the large concentrations of waterfowl during the spring and fall migrations.

17. Law Enforcement

Most of our law enforcement activity is centered around the general waterfowl season. This year nine violations were cited into court, six forfeited appearance bond and three appeared in court and were fined one-half of the appearance bond.

Violations that occurred were shooting non-game birds and animals, wanton waste and coyote hunting with a snowmobile. At year's end all cases were closed and \$962.50 were paid in fines and forfeited appearance bonds.

Many warnings were issued for a number of conditions where prosecution was not warranted. Six hunters were ejected opening morning for early shooting, of which there were many. Shooting began 20 minutes before legal time. Rumor had it that 26 were ejected - the second morning the first shot rang out one minute past legal shooting time. We did not have any early shooting thereafter.

I. EQUIPMENT AND FACILITIES

1. New Construction

a. Muddy Creek Hoist

A steel framework was fabricated and installed on to the north side of the pumphouse. A hoist was installed on the I-beam for moving pumps and motors out of the pumphouse and to aid in the loading and unloading operations. The overhead electric wires going to the pumphouse are a hazard for boom truck or loader operations.

b. Unit V Canals and Islands

The Unit V impoundment was dewatered and became dry enough for construction operations in September. C. M. Russell NWR loaned us their self-propelled John Deere scraper. Boyd Bergum worked several days on this unit and gave maintenanceman Marko tips on operation of the scraper.

Over three miles of canals were excavated around the outer perimeter of the basin to provide breeding pair and brood habitat during low water management. The excavated dirt was utilized to construct loafing and nesting islands. An experimental circle dike was constructed to provide a four acre nesting island for ducks and geese. The soil is a very tight clay and no subbing is expected through the dike but muskrat activity may cause a problem in future years. However, we thought it was a worthwhile experiment.

Two cut off islands were developed where narrow fingers of land projected out into the Unit V basin.

Canals will be excavated from the lower portions of the basin to provide positive drainage to the borrow areas. Fall moisture hampered our completion of the project. The unit will remain dry in 1984 so we can excavate the remaining canals and construct a pumpsite.



Unit V was dried to allow island construction and development of gravity drainage canals. Unit VI shows the zone of nesting habitat formed between the high water mark and low water management level.

11/83

RLP

2. Rehabilitation

a. Roads

The road on the III-V dike had very little gravel and made vehicle

access difficult during wet conditions. In September 400 cubic yards of gravel were purchased and dump spread on the road. The refuge grader was used to shape and finish the roadbed.

In the past some visitors had difficulty in finding the refuge entrance as they travelled up the Bootlegger Trail. A directional sign was built and placed along the Bootlegger Trail to alleviate this confusion. An office sign was built to help inform the public of our office location and hours of operation.

b. Landscaping

The Colorado spruce in the shelterbelt were initially planted too close to each other. Some of the spruce have died and others have become overcrowded. In June a local Transatree company was hired to move 119 spruce to correct these problems. Spruce excess to the shelterbelts were used as landscaping around the two refuge houses. After being transplanted, all trees were sprayed with Wilt-proof and fed Rapid-gro fertilizer. The large spruce were anchored and all were watered once a week during the summer months. Survival appears to be 100% but another year or two will be needed to be sure.

c. Buildings

The original shingles on the refuge houses and office were 20 years old and some had been damaged by strong winds. In April a private contractor was hired to shingle the two houses and office.

In June Quarters 82 began receiving a major rehab. The basement floor was repaired from a previous heaving problem. The three bedrooms, trimming and outside doors were painted. The basement sheetrock was perfataped and painted. The house was given a complete commercial cleaning inside and out. Traverse rods were purchased and installed on the windows. New roll-up curtains were purchased and installed to cover the basement storage shelf area. A new electric range was installed.

In November the Sears wood stove in the basement was replaced with a Blaze King and a new masonry chimney was constructed.

The screen doors on the two houses and office were replaced in September. The door locks on the living quarters were changed to improve safety aspects for children.

The Sears woodburning stove from Quarters 82 was installed in the office basement. Shelves were purchased and installed in the office basement to develop the office library. Reprint pamphlet holders were purchased for organizing the material.

3. Major Maintenance

With the moving and placement of the Colorado spruce, we realized that an updated headquarters utility map was needed. We had the local telephone and power companies mark the locations of their underground lines. In June the



The Colorado spruce were initially planted too close together. Some of the spruce have died through the years and others have become over crowded. A private tree mover was hired to transplant the spruce to make a more uniform shelterbelt. Spruce excess to the shelterbelt were used as landscaping around refuge housing.

06/83

RLP



updated map was completed showing the locations of telephone, electric, gas, water and sewer lines.

In August the Muddy Creek pump No. 1 was removed from the pumphouse to be overhauled. The pump had to be pulled up and set sideways inside the pumphouse before we could get it through the doorway. It had been nine years since any of the three pumps has been removed so a lot of trial and error experience was gained. A written step by step instructions were developed explaining equipment needed and which bolts were left or right hand thread.

The pump was sent to Gem Rewind of Lewiston, Idaho, to be repaired. The primary repair entailed complete replacement of all bearings and bushings and rebuilding shaft surfaces using a spray on liquid stainless steel process.

Some of the other major maintenance projects were:

- Honda 3-wheel ATV was overhauled
- Ford water truck and Dodge stake truck received new tires
- 1953 D-6 cat received new gaskets and generator mounting
- 1953 D-6 cat with cab received new transmission oil seals
- Wabco grader received a new manifold and U-joints
- 1966 GMC dump truck received a new clutch
- Domestic well house received a new sump pump and replacement of deteriorated pipes and valves

All equipment was serviced and repaired at a more frequent interval than has been possible for several years, due to the increase in the work force.

Roads were graded when soil moisture conditions were right.

Roadside mowing was undertaken in late summer prior to the hunting season to improve access.

4. Equipment Utilization and Replacement

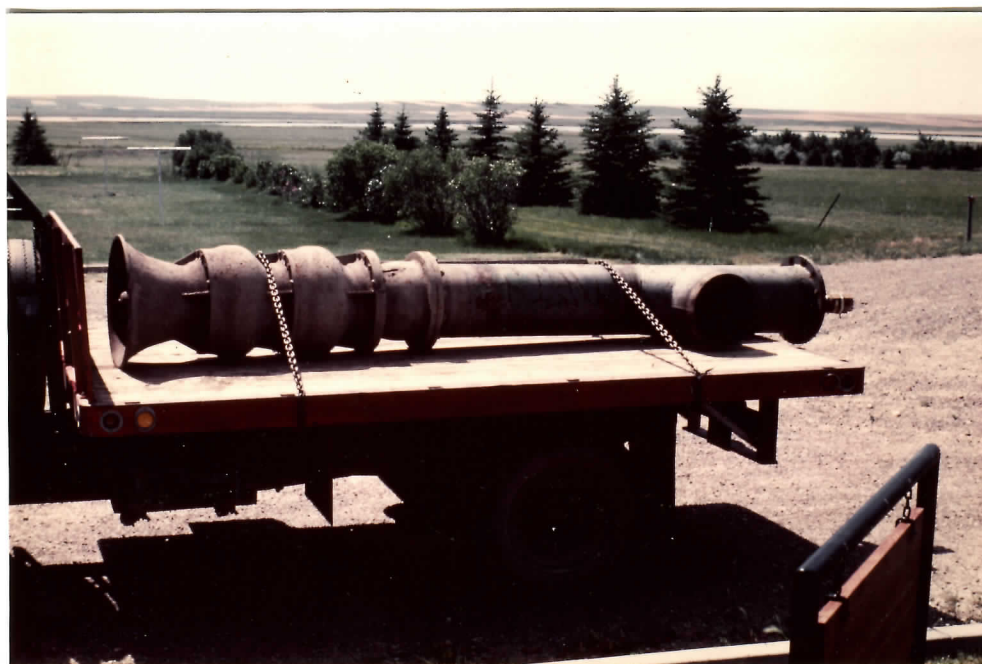
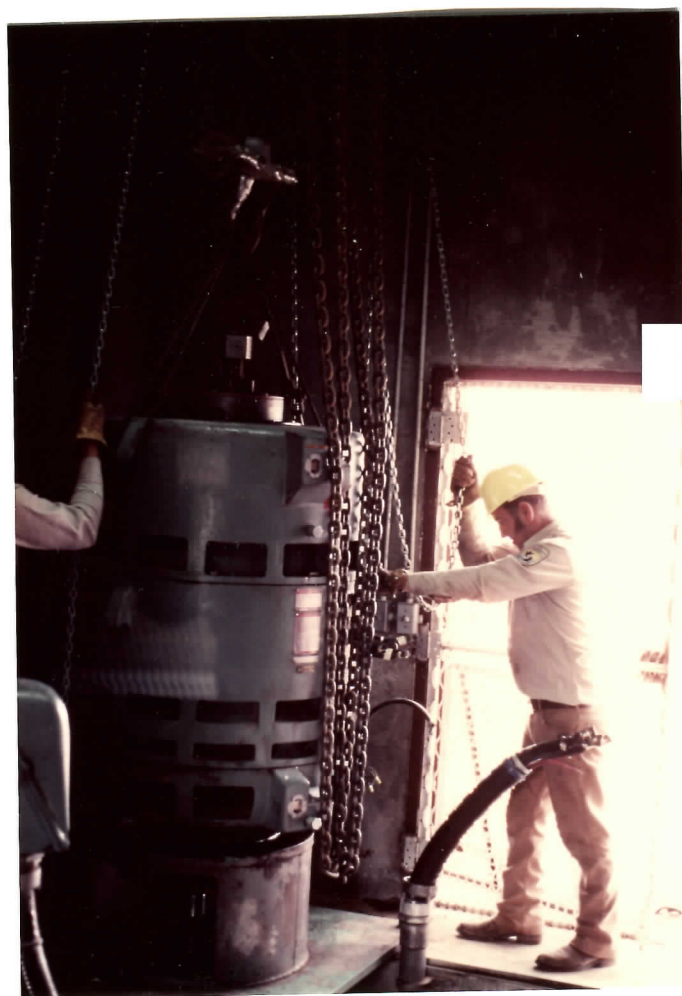
In January an exhaust system was installed in the shop. In addition, tool storage racks, shelves and supply cabinets were installed.

Equipment purchased this year:

- Parts washer
- Radial arm saw
- Electric miter box saw
- Cargo barriers for all pickups
- John Deere riding lawn mower

A surplus P&H crane truck was acquired from C. M. Russell NWR for moving pumps (inter-unit pumping station).

Muddy Creek pump No. 1 was sent to Gem Rewind in Lewiston, Idaho, to be overhauled. The pump removal and re-installation was no easy task.
08/83 JSF





This P&H crane was obtained from C. M. Russell NWR. This is a great asset for installing and moving the inter-unit pumps.

08/83

JSF

A surplus 1974 GMC flatbed truck with ramp hoist was acquired from Lake Andes NWR for transporting equipment to WPA's.

Leather fencing chaps (5) and safety climbing belts (2) were received from Monte Vista NWR. A conductivity meter was received from the U. S. Geological Survey in Denver.

The following items were acquired from surplus at Malmstrom Air Force Base and were transferred as indicated:

<u>Item</u>	<u>Disposition</u>
Rotary bin	Benton Lake
Metal table	Benton Lake
Concrete culvert	Benton Lake
JD seed drill	Benton Lake
Coat racks	Medicine Lake
Hotpoint refrigerator	Bowdoin
30 foot fiberglass ladder	Benton Lake
Metal storage frames	Benton Lake
Supply cart	Benton Lake
Spencer microscope	Benton Lake
Cold weather mittens	Benton Lake

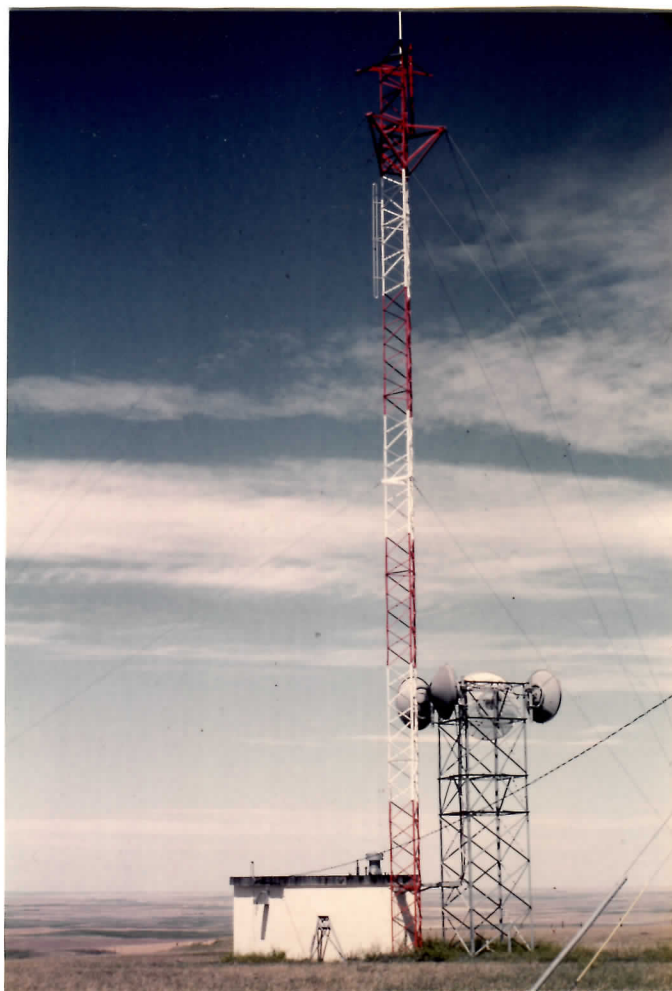
5. Communications System

Our communications system involving the repeater station located in Montana Power Company facilities on the Knees Butte approximately 30 miles north of the refuge has continued to be unsatisfactory as far as providing communications from the refuge out into the wetland management district. The lease with Montana Power Company lapsed in September and we decided not to renew it. We are negotiating with the newly established BLM office in Great Falls to utilize their repeater radio system facilities. Arrangements have tentatively been approved for us to receive a tie-in linkage with their system. When these arrangements are completed, we plan to dismantle our existing repeater facility.

The Knees Butte repeater site does not give us complete radio coverage throughout the wetland district. An agreement with the BLM using their repeater site on the Highwood Mountains is being negotiated.

07/83

RLP



An alternate site for our repeater was examined early in the year at Highwood Baldy east of Great Falls and we found the site, though inaccessible in the winter, is ideal topographically and we were able to communicate from our pickup mobile unit directly to our field fencing crew located on the Peterson WPA north of Cut Bank. It is felt that the expense involved

in maintaining an independent separate facility for our limited communication needs was not justified if such an arrangement could be made to have access and occasional use of the existing BLM facilities which are located at the Highwood Baldy site.

We are certain that if administrative arrangements can be made our communication needs will be more than adequately provided for and at a considerable savings to the government.

J. OTHER ITEMS

1. Cooperative Programs

Numerous day to day activities were coordinated with and participated in with the Montana Fish, Wildlife and Parks Department this year. The principal field tour and meeting this year was conducted at Medicine Lake NWR. Program presentations were made at the headquarters followed by a tour of the refuge and wetland management district.

2. Items of Interest

Refuge revenue sharing checks were delivered to seven counties totalling \$13,552 in early March. This gives the County Commissioners the opportunity to be briefed on current program status and to provide any local feedback pertinent to our programs.

3. Credits

Pearson wrote the Introduction and Sections A, D5, F, I5 and K. Tornow wrote Sections D2, E6-8, G, H., I 1-4, and J. Benway wrote sections B, E1,2,5; typed and assembled the report.

K. FEEDBACK

This year I want to send a beautiful bouquet to the many loyal, hard working, under recognized refuge field employees who, due to government policies, regulations, implied or real, quotas on performance recognition awards, or from lack of proper supervisory action, have not received the appropriate recognitions long deserved. Gentlemen and Ladies - my hat's off to you!



I hope you can pause for a moment in the treadmill of life and reflect on this picture taken on Highwood Baldy Mountain just east of Great Falls, Montana, and recall those extra efforts you've put in and the many uncounted contributions you've made for the benefit of the natural resources, and accept this pat on the back for a job well done.

Sincerely,

The Manager

BENTON LAKE
WETLAND MANAGEMENT DISTRICT

Personnel are listed in the previous report.

Reviews and Approvals

Submitted by _____ Date _____

Regional Office Review _____ Date _____

INTRODUCTION

The Benton Lake Wetland Management District was established in 1975. Initial delineation was conducted in 1966 - 1968 and in 1974 - 1975 by Marvin Plenert and Rod King. Acquisition began in 1974 by Realty Specialist Benjamin Lukes.

The district encompasses ten counties in north-central Montana from the Canadian border south to Deer Lodge, Montana. There are easements in all ten counties and waterfowl production areas in seven. The waterfowl production areas (WPA's) are widely scattered; the two farthest away are 120 miles from headquarters - each in opposite directions. The average distance to our WPA's from headquarters is 90 miles which makes management difficult, to say the least.



This high mountain wetland complex is adjacent to the McCormick WPA. Wetland easements have been taken around Kleinschmidt Lake and Brown's Lake, the two larger bodies of water in this photo.

11/83

RLP

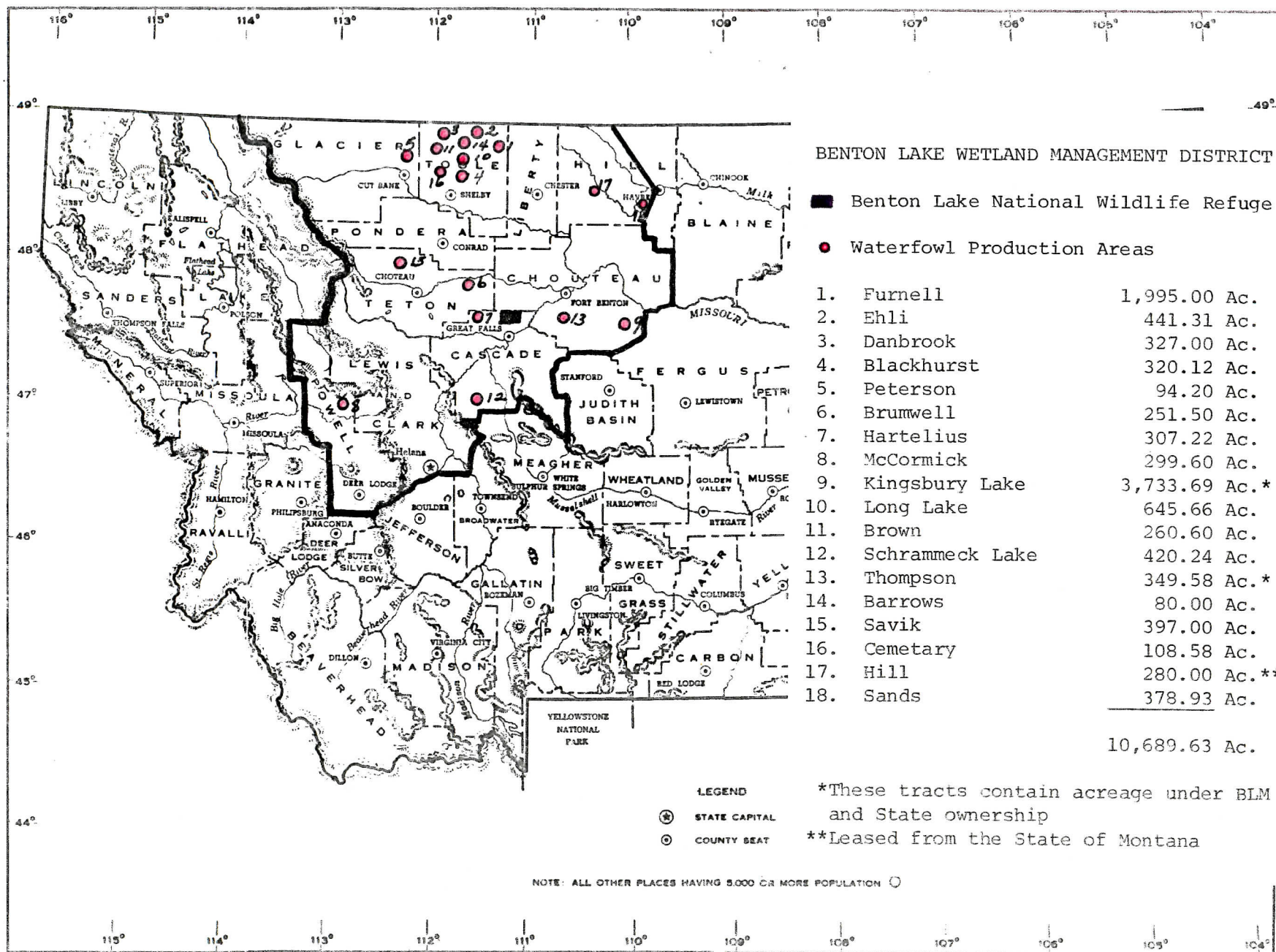


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A. HIGHLIGHTS

1. Gordon Sands donated 378.93 acres at Halfway Lake as a Waterfowl Production Area. Page 2
2. An additional 29 wetland acres were protected by easement in the district. Page 3
3. Approximately 193 acres of cropland were planted to dense nesting cover this year on three waterfowl production areas. Page 8
4. The fall easement inspection flight detected four burning violations, one fill and one ditch. Page 8
5. Peterson WPA boundary was fenced. Page 15



This easement holder has taken advantage of a drainage facility map to extend and deepen an existing ditch. Wind erosion from fallow farming often fills the ditches in. It's too bad the easement included the drainage facility map.

11/83

RLP

B. CLIMATIC CONDITIONS

Climate is discussed in detail in the refuge narrative report. The spring of 1983 received very little precipitation that provided runoff to the wetlands. Portions of Glacier and Toole Counties were proposed as disaster areas because of the drought conditions. Isolated severe hail storms hit portions of the district prior to the harvest of small grain.

C. LAND ACQUISITION

1. Fee Title

One tract was obtained this year in the form of a donation. Gordon C. Sands, long-time resident of Havre, Montana, donated 378.93 acres, of which 151 are wetland acres, 70 are cropland acres, and the remaining are native prairie. The acreage covers most of Halfway Lake, three miles southwest of Havre.



Nina B. and Gordon C. Sands donated 379 acres of prime waterfowl habitat on Halfway Lake. Accepting the donation for the Fish and Wildlife Service were Realty Specialist Rich Johnson and Assistant Manager Tom Tornow.

12/83

Bear Paw Sentinel photo

The unit will be managed as a waterfowl production area except for certain restrictions that came with the deed to the land. The restrictions were: no hunting, grazing or trapping; no 1080 would be permitted on premises; farming would only be permitted to establish habitat two out of every five years; construction of ten nesting islands when moisture conditions permitted the use of earth moving equipment.

Halfway Lake has been known as an excellent waterfowl area for many years. We were proud to accept this donation to ensure the perpetuation of this vital wetland.

The Ehli WPA needs a 120 acre roundout to allow essential water management. The current landowner is in favor of selling the portion of the marsh that is on his land but he wants more than the appraised value. Realty Specialist Johnson is still exploring options.

The wetland district currently has 8419.54 acres under fee title (Table I) and manages 10,689.63 acres in 18 WPA units. Three WPA's enclose acreage under BLM and state ownership.

2. Easements

Only one tract was acquired this year containing 29 wetland acres. The easement compliments the waterfowl production area in Toole County. Table II compares previous years' acquisitions.



The district map shows the location of easements, WPA's, and Benton Lake NWR. Blue pins mark active acquisition proposals.

02/84

TT

TABLE I

FEE TITLE TRACT ACQUISITION BY COUNTY

County	<u>1976</u> Acres	<u>1977</u> Acres	<u>1978</u> Acres	<u>1979</u> Acres	<u>1980</u> Acres	<u>1981</u> Acres	<u>1982</u> Acres	<u>1983</u> Acres	<u>TOTAL</u> Acres
Cascade				307.22 (1) *	375.40 (1)	44.84 (1)			727.46 (3)
Chouteau					2093.34 (7)				2093.34 (7)
Glacier		94.20 (1)							94.20 (1)
Hill								378.93 (1)	378.93 (1)
Powell	299.60 (1)								299.60 (1)
Teton	251.50 (2)						397.00 (1)		648.50 (3)
Toole	1675.00 (1)		1408.27 (6)		685.66 (4)	300.00 (4)	108.58 (1)		4177.51 (16)
TOTALS	2226.50 (4)	94.20 (1)	1408.27 (6)	307.22 (1)	3154.40 (12)	344.84 (5)	505.58 (2)	378.93 (1)	8419.54 (32)

TOTAL WETLAND ACRES	339.00	27.00	283.00	93.00	480.00	195.00	125.00	151.00	1693.00

*Number of tracts in each county shown in parenthesis

TABLE II

EASEMENT ACQUISITION BY COUNTY

County	1975 Wet Acres	1976 Wet Acres	1977 Wet Acres	1978 Wet Acres	1979 Wet Acres	1980 Wet Acres	1981 Wet Acres	1982 Wet Acres	1983 Wet Acres	<u>T O T T A L</u>	
										No.	Acres
Cascade								78 (4)		4	78
Chouteau								21 (1)		1	21
Glacier		881 (21) *	435 (13)	252 (4)	248 (5)					43	1816
Hill							407 (6)			6	407
Lewis & Clark								247 (2)		2	247
Liberty	393 (7)	35 (2)								9	428
Pondera	291 (3)	310 (4)								7	601
Powell								507 (2)		2	507
Teton		50 (1)								1	50
Toole	1338 (16)	372 (8)	159 (3)		311 (10)	687 (17)	37 (3)		29 (1)	58	2933
TOTALS	2022 (26)	1648 (36)	594 (16)	252 (4)	559 (15)	687 (17)	444 (9)	853 (9)	29 (1)	133	7088

TOTAL ACRES UNDER EASEMENT - - - 89,642.24

Cascade County 880.00
 Chouteau County 200.00
 Glacier County 20,982.22
 Hill County 3,292.86
 Lewis & Clark County 3,440.12

Liberty County 6,200.00
 Pondera County 3,335.00
 Powell County 4,650.00
 Teton County 800.00
 Toole County 40,861.04

D. PLANNING

2. Management Plan

Objectives for the wetland management district have not been significantly documented, but correspond to the objectives of other wetland management districts under the small wetlands program. Short range development plans are made for each WPA unit upon being acquired. Manpower and funds generally limit our activities to posting, fencing and conversion of cropland to dense nesting cover. Hopefully, once this is accomplished, wildlife will respond without much more maintenance on our part.

5. Research and Investigations

Saline seeps are becoming a primary problem due to past and current farming practices. The contamination of water within the district is primarily due to the fallow cropping system. In 1981, by cooperating with the Triangle Conservation District, a series of shallow cased wells were drilled on two WPA's for the purpose of monitoring sub-surface water tables. Data collected from these test wells will provide information on changes of water quality and ground water levels in response to our grass-legume planting and adjacent farming activity on recharge areas.

E. ADMINISTRATION

The ten county district is administered by personnel at Benton Lake Refuge and does not receive separate staffing or funding.

7. Technical Assistance

The Bureau of Land Management has initiated a Canada goose restoration program in the Ovando Valley near our McCormick WPA. The Montana State Department of Fish, Wildlife and Parks has closed the area to goose hunting. We have attended public meetings and encouraged placement of bales and the building of nest structures. The Fish and Wildlife Service has taken wetland easements in conjunction with this project around Kleinschmidt Lake.

8. Other Items

Revenue sharing checks for FY 82 were delivered in March of 1983 at 92% entitlement. Revenue sharing checks for FY 83 as of yet have not been issued, but we have been informed that they will be 77% of entitlement.

F. HABITAT MANAGEMENT

2. Wetlands

Two of our WPA's have water control structures. One at Ehli WPA cannot be used until the necessary private land is acquired, and one at Furnell WPA will be reworked in 1984 to allow some water management. The natural wetland basins are fed by spring runoff and spring rains. Last winter provided very little runoff except for the early May snowstorm. Only six WPA's (Furnell, Thompson, Savik, McCormick, Kingsbury Lake and Schrammeck Lake) contained water through mid-summer.

Three additional round bales were placed on the Thompson WPA the first week in January. Poor ice conditions prevented us from getting more round bales placed in other WPA's.

4. Croplands

This year we administered three cooperative farming permits for 147.9 acres. The permit on the Blackhurst WPA was terminated at the end of the year. The two remaining permits cover 99 acres of cropland used to alleviate crop depredations in Toole County as part of a public relations agreement. However, there has been little crop damage by waterfowl and we are slowly phasing the program down.

We received 325 bushels of barley as our share from the Blackhurst cooperator on 48.9 acres. The acreage will be converted to DNC in 1984.



Mule deer and white-tail deer populations have increased in response to the DNC plantings on WPA's.

07/83

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We planted an additional 193 acres of cropland into DNC this year on Danbrook, Blackhurst and Kingsbury Lake WPA's. We have converted 1754 acres of cropland into DNC since 1978.

5. Grasslands

The district currently contains 4281 acres of native short grass prairie. Our best management initially is a rest from grazing, and fencing the boundaries of the WPA's.

7. Grazing

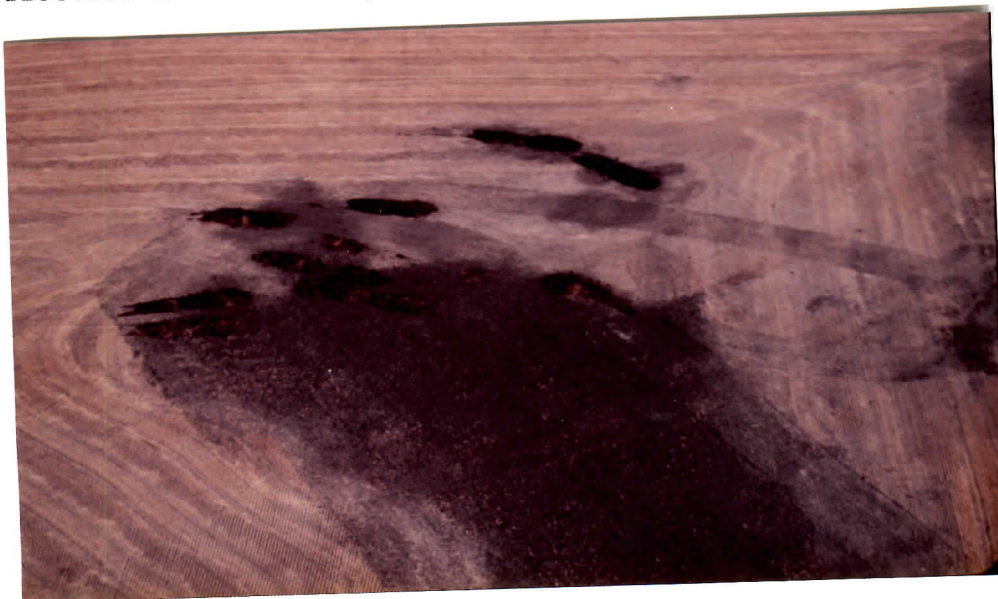
A reserved use grazing permit of 480 AUM's on the Furnell WPA expired this fall. This WPA will receive a rest from grazing.

A grazing permit for 75 AUM's was issued on the Savik WPA. Due to the marsh conditions along the adjacent landowner's pasture, we were unable to get the boundary fenced last summer. The permittee was charged for fence repair in return for grazing.

Trespass grazing occurred on the Thompson WPA. Due to a change in government farm programs, an adjacent landowner grazed 200 head of cattle on conservation acres along the north boundary. The north side previously had no history of grazing pressure and the original fence was in poor condition. The landowner removed his cattle from the WPA and a joint effort will be made to repair the fence.

13. WPA Easement Monitoring

A surveillance flight of the easements was done on November 15 and 16. Four burning violations, one fill and one ditch were detected. Registered letters were sent to easement holders concerning burning activities. Correction on the filling and ditching is still pending.



The fill in this easement wetland appeared to be manure; a violation of the easement agreement.

11/83

RLP

New easements were logged and filed. Aerial photos were ordered from the Department of Agriculture (ASCS) to complete our coverage of Toole County easements. New easement inspection maps were made and placed on cardboard backing with mylar overlay. A district map was made showing the locations of easements, WPA's, Benton Lake NWR and active acquisition proposals.

G. WILDLIFE

Our information on wildlife populations within the district is very minimal. Due to limited staff and the size of our district, surveys are usually accomplished incidental to work projects.

1. Wildlife Diversity

By reducing grazing pressure and converting monoculture croplands on our WPA's to dense nesting cover, we can assume that diversity of species would increase.

The district contains at least three distinct habitat types. Most of the WPA's are located in the short grasslands of the high rolling plains. The Sweetgrass Hills along the Canadian border are high elevation glaciated prairie (Furnell WPA). The high mountain valley riverside habitat is represented by the McCormick WPA near Ovando. It would be super to have the time to document what the diversity actually is.



The high mountain wetland complex is representative of the McCormick WPA.

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2. Endangered and/or Threatened Species

Sightings of bald eagles, American peregrine falcons, prairie falcons, Richardson's merlins and ferruginous hawks have been made in the district. Only the ferruginous hawk has been documented as nesting on Kingsbury Lake WPA annually. The bald eagle nests near the McCormick WPA.

3. Waterfowl

A Canada goose nest survey and a partial breeding pair count along with general observations formed the basis of estimating waterfowl production on our WPA's at 5300 ducks and 48 Canada geese. Fourteen Canada geese nests were documented: Big Sag (1), Kingsbury Lake (1), Schrammeck Lake (9), McCormick (1) and Danbrook (2).

Spring and fall waterfowl populations peaks are unknown. Only six of our 18 WPA's contained water for the fall migration.

4. Marsh and Water Birds

The red-necked grebe nests on a portion of the McCormick WPA. The remains of a fledged sandhill crane were found on the Savik WPA but nesting has not been documented. No other unusual occurrences or numbers were observed in the district.



The Savik WPA, located along the east front of the Rockies, was acquired in 1982. Neighbors have reported that sandhill cranes nest in this area.

03/83

TT

5. Shorebirds, Gulls, Terns and Allied Species

Low water levels provided abundant habitat for these species. Population estimates and use are unknown. Small colonies of Franklin gulls and black terns were observed on Schrammeck Lake and McCormick WPA's.

6. Raptors

Raptors that are known to nest on several of the WPA's are the red-tailed hawk, short-eared owl, marsh hawk and the great horned owl. Other raptors seen regularly are the golden eagle, Swainson's hawk, Cooper's hawk, and the American kestrel. Other raptors were mentioned in the endangered and threatened species section.

8. Game Mammals

Mule deer and white-tail deer populations continue to increase in response to our DNC plantings and are present on most WPA's. Antelope are also present on several WPA's. Hunting is allowed in accordance with state regulations.

10. Other Resident Wildlife

Hunttable populations of Hungarian partridge, sharptail grouse and ring-necked pheasant are present on several of the WPA's. Coyote, red fox, raccoon, badger, striped skunk, weasels and rattlesnakes are also present.



Rattlesnakes are quite common throughout the district. A den of several hundred rattlesnakes was discovered at Kingsbury Lake WPA.

07/83

RLP



Cattleguards restricting cattle movement along roads are often traps to wildlife. This young white-tail fawn was rescued after it was found hanging from a cross beam in the cattleguard.

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JSF

11. Fishery Resources

Furnell WPA has one trout pond stocked regularly by the Montana Fish, Wildlife and Parks Department. The water supply to this pond needs to be improved if the program is to be continued. It has been highly productive in the past.

H. PUBLIC USE

1. General

Monitoring public use on the district is very difficult. Most of the information we receive is reported directly to our office or is obtained by talking to adjacent landowners.

8. Hunting

Upland game, waterfowl and big game hunting is allowed on the WPA's. The degree of hunting pressure and success is unknown.

9. Fishing

The amount of fishing activity on the Furnell WPA pond and the Blackfoot River on the McCormick WPA is unknown.

10. Trapping

Trapping information is minimal. Trapping of muskrat, raccoon and coyote probably occurs on several WPA's.

17. Law Enforcement

Law enforcement activity is minimal. Trespass cattle, off-road vehicling and encroachment of farming operations are of concern. However, once the fencing projects are completed and with better signing and locked gates, some of the trespass problems should be solved.

We had one incident in January in which a man avoided the port of entry at the Canadian border and entered the United States by a back road. Customs had not let him enter the day before because of his record in Canada. The man lost control of his vehicle and hit a large rock in the ditch adjacent to the Brown WPA. The car caught on fire and burned two acres of the WPA before the Sunburst Volunteer Fire Department put the fire out. The man evidently hoofed it back to Canada and reported his car stolen. We found the burned car in March and pieced the details of the incident together. Through cooperation with the Toole County Health Department, the car was hauled to the county dump.



The Canadian border hopper found the rocks in the ditch were too much for his car. Thanks to the efforts of neighbors and the local volunteer fire department, the fire was contained quickly.

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I. EQUIPMENT AND FACILITIES

1. New Construction

Construction projects are ranked in priority between the refuge and the district and then we try to get as much done as possible. The Peterson WPA had a history of trespass cattle; this year one and one-half miles of fence were constructed around the boundary. Additional boundary posting and fence repair were done on several of the WPA's.

J. OTHER ITEMS

1. Cooperative Programs

Information and input was provided on the routing proposals for the Western Area Power Administration's 69 KVA power line from Great Falls to Conrad.

Information and input was given to the Marias River Weed Action Committee. The committee is attempting to obtain federal funding to combat noxious weeds in Glacier, Toole, Pondera and Liberty Counties.

3. Credits

This report was written by Tornow, edited by Pearson and typed and assembled by Benway.